

Amendments to the specification:

Please amend the paragraph beginning on page 3, line 20, as follows:

a1
Thus, expanding an optical fiber network to accommodate additional channels presents many challenges. It would be desirable to provide a system that allowed upgrades without disrupting all traffic on an optical transmission line, and without needing to predict the manner in which the network might develop. It would be further desirable that upgrade capability ~~included~~ include the ability to add additional channels in the transmission spectrum. It would also be desirable that such a system provide capability for signal improvement, such as dispersion compensation or level control, and avoid excessive insertion loss.

Please amend the paragraph beginning on page 5, line 26, as follows:

a2
The present invention provides an optical component array capable of being upgraded to increase the number of channels carried on an optical transmission line. The array may generally be expanded or improved with little or no disruption of existing optical signal traffic. The array allows installation of only those components needed to carry an existing traffic load, for example 8 dense wavelength division multiplexed ("DWDM") channels, while allowing expansion of the number of channels, for example to 160 DWDM channels. The array avoids the up-front cost and reliability issues of providing multiplexers, amplifiers, and associated components capable of handling the entire ~~planned~~ planned channel expansion at the time of system installation, compared to a conventional amplifier array. In one embodiment, the array allows manipulation of the optical signal in one path of an amplifier array, such as for dispersion compensation, amplitude leveling, or channel ADD/DROP, while passing the optical signal in other paths without such manipulation.

Please amend the paragraph beginning on page 6, line 22 as follows:

a3
The input signal is optically coupled to a wavelength selective input filter 16 that passes a first portion $\lambda 1$ of the input signal to an optical component 17, which couples the first portion of the signal to a wavelength selective output filter 20. The optical component could be an amplifier, for example, as described below in reference to Figs. 1A and 1B, or could be another type of optical device, such as a dispersion compensation module or amplitude correction module. The first portion of the input signal could be modified, such as by leveling or dispersion compensation, or even replaced, such as in an ADD/DROP

93
process, thus the output λ_1' of the optical component 17 could be essentially identical to or quite different from (within the same segment of the spectrum) ~~from~~ the input to the component, but is generally modified. The input filter and output filter could be a channel selective (i.e. bandpass) filter, for example, or could be a low-pass or high-pass filter. For purposes of discussion, "low-pass" and "high-pass" will refer to low and high frequencies, which correspond to longer and shorter wavelengths, respectively. Generally, the signal filters transmit a selected portion of the input signal and reflect other frequencies.

Please amend the paragraph beginning on page 8, line 39, as follows:

94
In a particular application, all signals carried on the input transmission line are passed through one of the optical components in one of the rungs of the array, and the shunt transmission line is left open as a pair of ports. This allows the array to be upgraded by adding additional rungs to accommodate additional channels that are not occupied on the initial input signal. For example, an optical network might be initially installed that only has enough traffic to justify three channels, although the optic fiber transmission lines might be capable of handling forty channels. The array of the present invention allows initial installation of only those components and associated circuits necessary to handle the planned initial three channels of signal traffic, while allowing expansion and growth as needed, without disrupting the pre-existing signal traffic. The unoccupied channels may be at the high or low end of the potential input signal spectrum, or may be interspersed with occupied channels.

Please amend the paragraph beginning on page 11, line 26 as follows:

95
In a particular application, all signals carried on the input transmission line are amplified by one of the amplifiers in a rung of the array, and the shunt transmission line is left open as a pair of ports. This allows the amplifier array to be upgraded by adding additional rungs to accommodate additional channels that are not occupied on the initial input signal. For example, an optical network might be initially installed that only has enough traffic to justify three channels, although the optic fiber transmission lines might be capable of handling forty channels. The amplifier array of the present invention allows initial installation of only those amplifiers and associated circuits necessary to handle the planned initial three channels of signal traffic, while allowing expansion and growth as needed, without disrupting the pre-existing signal traffic. The unoccupied channels may be at the

Q5
high or low end of the potential input signal spectrum, or may be interspersed with occupied channels. In some instances, some rungs may have the capacity to handle additional channels. For example, the wavelength selective input filter may pass a segment of the transmission spectrum containing a number of contiguous channels, only one of which is occupied. The amplifier in that rung may be designed to handle all of the channels passed by the input filter, if and when the additional channels become occupied, or might be upgraded at a later date to handle the additional signal traffic. Alternatively, the amplifier in that rung could be removed and replaced with a sub-ladder, assuming the wavelength selective filters on that rung can remain in place while removing the amplifier, without disrupting signal traffic on the other rungs.

Please amend the paragraph beginning on page 18, line 1, as follows:

Q6
For purposes of illustration, the red ladder 170 is shown with a pair of bypass ports 172, 174 cascading off the last rung, as is the blue ladder 176. As described above in conjunction with Figs. 1A and 3A, the ladder configuration allows upgrading of the amplifier array by adding additional rungs to accommodate additional segments of the input spectrum as those segments are occupied with signals, without disrupting existing signal traffic. For example, suppose the amplifier array shown in Fig. 3B routes each of the occupied channels (and potentially unoccupied channels) on the input signal through one of the existing amplifiers, but it is desired to add additional channels on the input transmission line 14. Additional rungs may be added onto either ladder without disrupting the signal traffic being carried by the system. It is specifically understood that the additional channels do not need to be added at one end of the band or the other, and that segments of the input signal spectrum might not be occupied, as discussed above in reference to Fig. 1A, even if that [[the]] portion of the spectrum containing the segment would be passed by an existing input and output filter pair.

Please amend the paragraph beginning on page 20, line 31, as follows:

Q7
A desirable feature of preferred interleaf multiplexers is that, unlike a filter matrix of certain types of conventional multiplexers, the precise number of channels to be multiplexed does not need to be anticipated, as long as the channels fall within the operating band of the interleaf multiplexer. Operation of these interleaf multiplexers works on a

97

frequency interference type effect, producing $[[a]]$ "combs" of odd and even channels when the proper optical signals are present.
